

**UNITED STATES  
DEPARTMENT OF LABOR  
MINE SAFETY AND HEALTH ADMINISTRATION  
Metal and Nonmetal Mine Safety and Health**

**REPORT OF INVESTIGATION**

**Surface Nonmetal Mine  
(Construction Sand and Gravel)**

**Fatal Machinery Accident  
May 1, 2009**

**C & P Sand & Gravel, Inc.  
C & P Sand & Gravel, Inc.  
Odem, San Patricio, Texas  
Mine ID No. 41-03347**

**Investigators**

**Gary L. Cook  
Mine Safety and Health Specialist**

**Jerry Y. Anguiano  
Mine Safety and Health Specialist**

**Dale P. Ingold, PE  
General Engineer**

**Originating Office  
Mine Safety and Health Administration  
South Central District  
1100 Commerce Street, Room 462  
Dallas, TX 75242-0499  
Edward E. Lopez, District Manager**



## **OVERVIEW**

On May 1, 2009, Jose E. Salazar, Dredge Operator, age 59, was fatally injured when he became entangled in one of two positioning winches on a dredge. He was attempting to hand guide the cable onto the winch while it was rewinding.

The accident occurred because management had not established adequate policies and safe work procedures for performing maintenance on the dredge. The winch was not taken out of service when the winch control lever functions reversed following the installation of a new winch cable. The winch was not shut off before maintenance was performed.

## **GENERAL INFORMATION**

C & P Sand & Gravel, Inc., a surface dredging operation, owned and operated by C & P Sand & Gravel, Inc., was located in Odem, San Patricio County, Texas. The principal operating official was Eleazar Cantu, Sr., President. The mine operated one 9.5-hour shift per day on an intermittent basis. Total employment was three persons.

Sand and gravel was dredged from a pond and pumped as slurry to an on-site plant about 0.25 miles away. The material was processed through the plant to produce sand products for local construction projects.

The last regular inspection at this operation was completed on November 20, 2008.

## **DESCRIPTION OF THE ACCIDENT**

On May 1, 2009, Jose E. Salazar (victim) reported for work at 7:30 a.m., his normal starting time as dredge operator. He had returned to work on April 27, 2009 after a four-month layoff but operated the dredge for only about one hour after preparing it for operation. Salazar operated the dredge throughout the day on April 28, 2009, but reported having difficulty positioning it. Salazar did not work on April 29-30, 2009.

Salazar spoke with Eleazar Cantu, Sr., President, at the scale house for a few minutes before driving to the dredge. Eleazar Cantu, Sr. loaded two trucks with sand while Salazar drove to the dredge to conduct a workplace examination and prepare to operate the dredge.

Eleazar Cantu, Sr. had replaced the winch cable for the left dredge positioning winch on April 24, 2009, before Salazar returned to work. He installed the new winch cable to reel in over the top of the winch drum rather than to reel in under the bottom of the winch drum as the previously installed cable had done. The hydraulic valve lever for the left positioning winch then functioned in reverse to the way it had previously functioned.

While attempting to position the dredge for operation, Salazar reeled out cable from the left positioning winch rather than reeling in the cable, resulting in a slack cable. He then locked the left positioning winch valve lever into the 'reel in' position and exited the dredge operator's booth to hand feed the cable onto the left positioning winch drum. After the winch cable snagged his hand, Salazar became entangled on the winch.

A loop of winch cable then came off the winch drum and became entangled on the clutch end of the winch causing the winch drum to stop rotating. Hydraulic pressure in the system forced hydraulic fluid around the O-ring on the hydraulic pump shaft and hydraulic fluid sprayed on the diesel engine, creating a cloud of bluish-white smoke.

Eleazar Cantu, Sr. and his son, Eleazar Cantu, Jr., Administrative Officer, were waiting at the scale house where they could observe the end of the dredge discharge pipe. When

slurry did not flow from the pipe in a reasonable time, they looked in the direction of the dredge and saw the bluish-white smoke rising from that area. Eleazar Cantu, Sr. drove to the dredge to determine what was causing the smoke.

At approximately 8:20 a.m., Eleazar Cantu, Sr. arrived at the dredge pond but could not see Salazar. He walked along the bank of the pond and eventually saw Salazar kneeling on the dredge deck. He yelled toward the victim but received no response.

Eleazar Cantu, Sr. swam about 30 yards to the dredge to check on Salazar because Salazar had used the only available boat to access the dredge. He climbed onto the dredge, shut off the diesel engine, and found Salazar non-responsive slumped over the left positioning winch.

Eleazar Cantu, Sr. then rowed the boat back to the bank of the pond. He called his son using a walkie-talkie and asked for a call to emergency medical services (EMS). EMS arrived at 8:47 a.m. and Salazar was pronounced dead shortly after that by the local Justice of the Peace.

## **INVESTIGATION OF THE ACCIDENT**

On the day of the accident, the Mine Safety and Health Administration (MSHA) was notified at 9:03 a.m. by a telephone call from Eleazar Cantu, Jr., Administrative Officer, to Terry Worley, Acting Supervisory Mine Safety and Health Inspector, at the MSHA San Antonio field office. An investigation was started the same day. Also on May 1, 2009, an order was issued pursuant to section 103(k) of the Mine Act to ensure the safety of miners.

MSHA's accident investigation team traveled to the mine, made a physical inspection of the accident scene, interviewed employees, and reviewed documents and work procedures relevant to the accident. MSHA conducted the investigation with the assistance of mine management.

## **DISCUSSION**

### **Location of the Accident**

The accident occurred on a dredge located on the most eastern of four ponds at the mine. The area was outdoors where the temperature was 72 degrees Fahrenheit and the sky was overcast with a slight wind. Weather was not considered to be a factor in the accident.

### **The Dredge**

The dredge involved in the accident was fabricated locally and was powered by a 335-horsepower diesel engine. It was about 42 feet long (stern to front end of the pontoons) and 13 feet wide and had a work deck about 20 feet long and 13 feet wide. An 8-inch by 8-inch dredge pump was mounted on the deck and was powered by the diesel engine. A

45-foot long suction pipe was mounted on the front of the dredge to siphon material from the bottom of the pond. A discharge pipe attached to the rear of the dredge was mounted on floats and extended to the plant.

A small hydraulic pump was mounted on the diesel engine and provided power to two positioning winches and one suction pipe winch through a valve bank located in the dredge operator's booth located on the right side of the dredge deck. The dredge was positioned in the pond by attaching the cable-ends of the two positioning winches to stationary objects on the bank then reeling in one cable while reeling out the other cable but keeping both winch cables taut.

After the accident, investigators found that the amount of hydraulic fluid in the dredge hydraulic system was too low to operate the three winches. A defective O-ring seal on the hydraulic pump shaft had failed under continuous hydraulic pressure after the left positioning winch drum stopped rotating.

### **The Winch**

The winch involved in the accident was located on the left front side of the dredge deck. It operated at 12 rotations per minute with a maximum line pull of 8,000 pounds at 12 feet per minute. The winch was designed to accommodate a winch cable with a diameter of 1/4-inch, 5/16-inch, or 3/8-inch.

After more hydraulic fluid was added to the hydraulic system, investigators found the winch was inoperable. During the accident, one loop of winch cable came off the drum and became entangled on the clutch side of the winch.

### **The Winch Cable**

The winch cable involved in the accident was a 165-foot long 5/16-inch galvanized wire rope (cable). It had been installed to reel in over the top of the winch drum rather than under the winch drum as the previous winch cable had done.

### **The Valve Bank**

The valve bank that controlled the winches was located in the dredge operator's booth. It included one bi-directional valve for each of the three winches. The valve for the right positioning winch was self-centering but the valve levers for both the left positioning winch and the suction hose winch would lock into either reeling (in or out) position.

Prior to replacement of the winch cable, pushing the valve lever for the left positioning winch to the left caused the winch to reel in the cable and pushing the valve lever to the right caused the winch to reel out the cable. These functions became reversed when the new cable was installed to reel in over the top of the winch drum rather than reeling in under the bottom of the winch drum as the previous cable had done.

### **Training and Experience**

Jose E. Salazar had 3 years and 5 weeks of experience, all at this mine. He had received all training in accordance with 30 CFR Part 46.

Eleazar Cantu, Sr. had 4 years and 47 weeks of experience, all at this mine. He had received all training in accordance with 30 CFR Part 46.

Eleazar Cantu, Jr. had 4 years and 47 weeks of experience, all at this mine. He had received all training in accordance with 30 CFR Part 46.

### **ROOT CAUSE ANALYSIS**

A root cause analysis was conducted and the following root cause was identified:

**Root Cause:** Management had not established clear policies and procedures for winch maintenance.

**Corrective Action:** The mine was permanently abandoned before management could implement corrective action.

### **CONCLUSION**

The accident occurred because management had not established adequate policies and safe work procedures for performing maintenance on the dredge. The winch was not taken out of service when the winch control lever functions were reversed following the installation of a new winch cable. The winch was not shut off before maintenance was performed.

### **ENFORCEMENT ACTIONS**

ORDER No. 6461180 was issued on May 1, 2009, under the provisions of Section 103 (k) of the Mine Act:

A fatal accident occurred at this operation on May 1, 2009, when a miner was pulled into the pinch point of a winch. This order issued is to assure the safety of all persons at this operation. It prohibits all activity at the dredge until MSHA has determined that it is safe to resume normal operations in the area. The mine operator shall obtain prior approval from an authorized representative for all actions to recover/or restore operations to the affected area.

This order was terminated on May 26, 2009, after the mine was permanently abandoned.

CITATION No. 6230419 was issued on May 26, 2009, under provisions of Section 104 (a) of the Mine Act for a violation of 56.14100(c):

A fatal accident occurred at this operation on May 1, 2009, when a miner became entangled in one of two positioning winches on a dredge. The winch was not taken out of service after it became apparent that the new cable was not spooling onto the winch in the same manner as the old cable.

This citation was terminated on May 26, 2009, after the mine was permanently abandoned.

CITATION No. 6230420 was issued on May 26, 2009, under provisions of Section 104 (a) of the Mine Act for a violation of 56.14105:

A fatal accident occurred at this operation on May 1, 2009, when a miner became entangled in one of two positioning winches on a dredge. The power to the winch was not shut off before maintenance was performed on the winch.

This citation was terminated on May 26, 2009, after the mine was permanently abandoned.

Approved: \_\_\_\_\_

Edward E. Lopez  
District Manager

Date: \_\_\_\_\_

**APPENDIX A**

**PERSONS PARTICIPATING IN THE INVESTIGATION**

**C & P Sand and Gravel, Inc.**

Eleazar Cantu, Sr.....President

Eleazar Cantu, Jr.....Administrative Officer

**Mine Safety and Health Administration**

Gary L. Cook.....Mine Safety and Health Specialist

Jerry Y. Anguiano..... Mine Safety and Health Inspector

Dale P. Ingold, PE.....General Engineer

## APPENDIX B

Accident Investigation Data - Victim Information										U.S. Department of Labor		
Event Number: 1 0 5 6 3 6 9										Mine Safety and Health Administration		
<b>Victim Information: 1</b>												
1. Name of Injured/Ill Employee: <i>Jose E. Salazar</i>			2. Sex <i>M</i>	3. Victim's Age <i>59</i>		4. Degree of Injury: <i>01 Fatal</i>						
5. Date(MM/DD/YY) and Time(24 Hr.) Of Death: <i>a. Date: 05/01/2009 b. Time: 8:50</i>						6. Date and Time Started: <i>a. Date: 05/01/2009 b. Time: 7:30</i>						
7. Regular Job Title: <i>172 dredge operator</i>				8. Work Activity when Injured: <i>039 maintenance</i>				9. Was this work activity part of regular job? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				
10. Experience			b. Regular			c. This			d. Total			
a. This												
Work Activity: 3 5 2			Job Title: 3 5 2			Mine: 3 5 2			Mining: 3 5 2			
11. What Directly Inflicted Injury or Illness? <i>079 winch cable</i>						12. Nature of Injury or Illness: <i>100 loss of arm</i>						
13. Training Deficiencies:												
Hazard:			New/Newly-Employed Experienced Miner:			Annual:			Task:			
14. Company of Employment: (If different from production operator) <i>Operator</i>						Independent Contractor ID: (if applicable)						
15. On-site Emergency Medical Treatment:												
Not Applicable:			First-Aid:		CPR:		EMT: <input checked="" type="checkbox"/>		Medical Professional:		None:	
16. Part 50 Document Control Number: (form 7000-1)						17. Union Affiliation of Victim: <i>9999</i>					<i>None (No Union Affiliation)</i>	